PLAN SUBMITTAL REQUIREMENTS
FIRE ALARM AND DETECTION SYSTEMS

(Title 19, 24, NFPA 13, NFPA 72)

General: Plans must be clearly legible and where possible, drawn to 1'0" = 1/8" scale. Plans that are not legible may be rejected by the plan reviewer as unacceptable for plan review purposes. Only electrical equipment, devices, wiring, etc. related to the fire alarm system(s) should be shown on the plans. Ensure the background is coordinated with the Architectural Floor plans, and include rated wall and door locations, and uses of all areas or spaces.

Revisions to plans previously approved by DSA, must be **"clouded"** or otherwise **"highlighted"** to clearly identify changes from the original submittal (per Title 24, Part 1).

1. PROJECT INFORMATION: Provide the following information and notes on the plans:

1.1 Scope of work: Brief project description as it pertains to your plan submittal. Include description of occupancy or use of structure(s). Note the names or designations of all buildings on site.

1.2 Type of Fire Alarm System (Addressable vs. Non-Addressable): An Addressable or non-addressable system, and if power limited, non-power limited, or a combination of both; and if both; which circuits are which. This will assist your plans examiners in determining whether the conductors and cables being considered are appropriate for the installation, and which ones can be mixed within a raceway (conduit) system.

1.3 TYPE OF FIRE ALARM SYSTEM (MANUAL VS. AUTOMATIC):
Indicate which type the system is;

1.3.1 MANUAL SYSTEM: Minimum code requirements: Manual fire alarm boxes (Pull Stations) shall be located throughout the protected area so that they are unobstructed and accessible. Spaced so that travel distance to the nearest Pull Station does not exceed 200 feet measured horizontally on the same floor Manual systems may have the Pull Stations inside the buildings provided that every exit in occupied areas (except restrooms, Custodian rooms, and storage rooms) are equipped with a Manual Pull Station. Travel distances within common use areas (Large Assembly areas, interconnecting Office spaces, etc.) shall not exceed 75 feet.

1.3.2 MANUAL SYSTEM WITH PARTIAL, SELECTIVE or SUPPLEMENTARY DETECTION: (See NFPA 72 for minimum requirements)

1.3.3 TOTAL (COMPLETE) AUTOMATIC HEAT AND SMOKE DETECTION SYSTEM: Required in all new campuses as of 1 July 2002, and in modernizations, additions or upgrades in existing campuses with a valuation of $200,000 or more. Such systems shall be configured as follows:

1.3.3.1 Manual Pull Stations are required in all large Assembly Areas (within 75 feet Travel Distance), and one Manual Pull Station is required in the Administration Office.

1.3.3.2 **Voice Communication System with Secondary power Supply** is required for Assemblies with 1000 or more occupants when used routinely for the general public. These "joint use" facilities are normally Auditoriums or Theatres where commercial performances are given, and where other types of uses, not associated with the school campus, are conducted.

1.3.3.3 **Heat detectors** may be omitted from non-combustible spaces and from concealed combustible spaces provided with an automatic fire sprinkler system.

- Heat detectors may be used in lieu of smoke detectors in the following areas:

1. Mechanical, Electrical and Storage rooms.

2. Science Labs, Auto Shops, Welding/Metal and Woodworking Shops and other areas where experiments or other activity produce inordinate amounts of fumes or other particulates that will initiate "nuisance" alarms.

3. Near Shower rooms or other areas that produce steam.

4. Kitchens with smoke producing equipment.

5. Closets and small storage rooms (100 Square Feet in area or less), or other small unconditioned spaces.

6. Systems that require the operation of two automatic detectors to initiate the alarm response shall be permitted per NFPA 72 Section 3-8.3.2.3.2. In all cases the DSA Plan Reviewer will determine the applicability of this type of system.

- Fire Sprinklers may be used in lieu of Heat Detectors in concealed combustible spaces. Ensure that the entire area under consideration will have a fire sprinkler system installed. Provide a statement on the floor plans indicating each area where the substitution is being utilized.

NOTE: Portable buildings may be exempt for three years after placement on a site. (See CBC and CFC for minimum requirements):

1.4 **DSA project number and School District file number**. (Closed with Certification confirmation)

1.5 **School name and address**.

1.6 **Plans shall be stamped** by the licensed Electrical Engineer and/or licensed Architect of Record, whomever is responsible for the design, with current renewal dates and "wet" signatures.

1.7 **Symbol legend** for fire alarm system. Symbols shown on the Symbol Legend must match those in Architectural, General Electrical, and Floor plans for the Fire Alarm System. NOTE: To expedite plan review, exclude symbols for components that are not part of the project.

1.8 **Equipment List:** (May be combined with the symbol legend when identified as such)

1.8.1 Indicate the make and model of each fire alarm component.

1.8.2 Indicated the current CSFM listing number for each component.

1.9 **Sequence of Operations:** Written sequence of operations or a Matrix of operations indicating what occurs when the system is activated in "alarm and "trouble" conditions.

1.10 **Notes** on the plans indicating the following:

1. The system shall conform to current California Code of Regulations (CCR) Titles 19 & 24 as applicable to this project, and National Fire Protection Agency (NFPA) Standard 723.

2. Upon completion of system installation, the system shall be tested in the presence of and in a manner acceptable to DSA/Project Inspector. The Contractor must supply necessary testing equipment including a "sound level meter" to check acceptable decibel levels of audible devices. Provide test results per The NFPA 72 "Record of Completion" to Architect, DSA, Project Inspector, Owner, and to the Local Fire Authority. All normally occupied areas shall be provided with a fire alarm audible decibel level at 15 dBa above ambient noise levels.

3. The "End Of Line Resistance" for each circuit shall be tested in the presence of the Project Inspector and shall not to exceed a maximum of 10% of the 24 volt system. Each component in the circuit shall not exceed the listed manufacturer's minimum operating voltages. See NFPA 72, Loop Resistance. This section requires that all initiating and indicating (notification appliance) circuits to be measured and recorded..

4. Penetrations of all fire-rated walls shall be protected in accordance with the California Building Code.

5. Provide details and design numbers of through-penetration fire stopping systems.

2. **PLAN SUBMITTAL:** Plan submittal shall be in accordance with item 1.0 and the following: Include information and details indicated below as applicable to the project. All plans must be clear and legible, with clearly defined walls (rated and non-rated), reflected ceiling details, platforms, etc.

2.1 **Site Plan** showing:

1. All structures on the site.

2. Each system's connection(s) and show the interconnection(s) of structures on the site (clearly labeled).

3. Locations of FACP and all Sub-panels or Power Boosters, and Annunciater Panels.

4. Distances of all conduit runs from FACP and Sub-panels to buildings or devices.

5. Locations of all "Exterior Audible" appliances, include Fire Sprinkler Bells or Horns as applicable.

6. Locations of all PIV's, Detector Check Valves, Water Flow indicators, and other devices with supervisory capability.

2.2 Building floor plan(s) at 1'0" = 1/8" scale.

1. Identify and indicate the height of all walls that are NOT full height. Walls not indicated with specific heights will be considered to be full height and require fire alarm appliances accordingly.
2. Identify all elevation changes.
3. Identify the use of all areas. The uses must correspond with the Architectural Floor Plans.
4. Identify Fire-rated corridor(s), walls for occupancy and area separation(s), and other rated walls to determine requirements for penetration protection.
5. Provide "Cross-section" detail(s) indicating the ceiling and/or roof construction for determining smoke and heat detector spacing as applicable.
6. Show Type and location of fire alarm panels, detectors, manual pull stations, audible alarm appliances, visible notification appliances, supervisory signal components, EOL'S, equipment and devices, all identified by symbols matching the symbol legend.
7. Show all wiring, indicating number, type and size of wires for each circuit.
8. Sequentially number each circuit and component. The labels must correspond with the Riser Wiring Diagram.
9. If utilizing ceiling mounted visible notification appliances indicate the height of the applicable ceilings.
10. Indicate height of library stacks or storage walls (those not indicated will be presumed to be full height).
11. Show all doors and door swings, Floor to ceiling windows, skylights (for ceiling mounted appliances) and other openings, projections, elevation changes, etc. that would affect the placement of alarm appliances.

2.3 Mixing of Appliances: Use of both Horns, and Bells is allowed but not recommended. All notification appliances must produce the same pattern.

1. All new systems or system upgrades shall produce the California Temporal Pattern.
2. Systems being extended or repaired may maintain the existing pattern, but must be converted to the California Temporal Pattern at the next system wide upgrade.

2.4 Audible notification appliances: Ensure that all appliances provide 15dBA above ambient noise in all areas.

1. Normal occupied classroom ambient sound levels are estimated at an average of 55dBA, with shops, band rooms, etc. much higher.
2. Provide additional Audible Notification Appliances as necessary to attain 15dBA above ambient. All areas shall be tested using a sound level meter, and witnessed by the Project Inspector. Voltage Drops for each circuit or appliance will be annotated on the Fire Alarm Acceptance Check List.

5.5 Visible Notification Appliances are required in all areas noted in CFC Amendment to NFPA 72, Section 4-4.5, and shall include:

1. Nurse's Offices and Cot Rooms (ensure curtains do not obstruct the visible notification appliances).
2. Classrooms (See DSA IR 11B-1).
3. Music, Choir and all associated Practice Rooms (note offices in these areas may also require visible notification appliances due to the residual noise of the Band or Choir rooms).
4. Fire-rated corridor(s), walls for occupancy and area separation(s), and other rated walls to determine requirements for penetration protection.
5. Cross-section detail(s) or notes(s) describing the ceiling and/or roof construction for determining smoke and heat detector spacing as applicable.
6. All Vestibules (to Sanitary {toilet} rooms, lobbies, stages, etc.)
7. All Sanitary {toilet} rooms (note if any full height partitions are in the room, and provide additional appliances as necessary).
8. Vocational Classroom areas may require additional appliances due to the excessive noise levels (Auto, Wood, Metal, & Photo shops, etc.)
9. Other common use areas.

2.6 Sequentially number each circuit and component.

1. Identify each appliance for both initiating devices and notification appliances

   For example: (sequentially number each circuit and component)
   A1-1 = Audible circuit #1, device #1
   P3-4 = Initiation circuit #3, device #4, etc.

   Identify devices in the sequence intended to be wired per the riser diagram.

2. Show the candela rating of each visible notification appliance adjacent to the device on the floor plans.

3. Provide mounting details of all components as applicable (ie: manual boxes, audible, visible and combination visible/audible notification appliances, etc.). Show mounting heights and "Beam Detector" installation directives (ie: maximum height above finished floor, horizontal spacing, etc.).

2.7 Wiring Riser Diagram and additional information as necessary to show the following:

1. Show all devices, appliances, components and equipment by symbols matching the symbol legend for each circuit.
2. Wire type, gauge, length and number of conductors in each circuit, or cable. Spare conductors shall be identified.

   NOTE: Wiring must be listed for use as required by Title 24 Part 3 (CEC) Article 760 for non-power limited and power limited circuits. Additionally use "THHW" or equivalent for wet locations.

3. Zone identification when (or where) applicable.
4. Circuit identification by style for both initiating device and notification appliance circuits.
5. Candela rating of each Visible Notification Appliance per UL Standard 1971 and NFPA 72, Chapter 4.
6. Electrical panel and circuit breaker supplying main power to FACP and sub-panels as applicable.

7. For additions to existing systems show new and existing circuits and components for all buildings in "Scope of Work". Provide copies of fire alarm plans previously approved by DSA "For Reference Only" to verify types, locations, and number of components on a given circuit

2.8 **"Point-to-Point"** wiring detail for each type of device or appliance being installed.

2.9 **Battery type(s), amp hours and load calculations** separately for the FACP and each sub-panel with a battery standby.

2.10 **Operation Matrix** with the following identified:

1. **Standby Operation** (100% of applicable components for 24 hours).
2. **Alarm Operation** (100% of applicable components for 5 minutes) after 24 hours of Standby Operation).
3. Control Panel or Sub-panel amperage draw.
4. List of components by model, which draw power from the panel. Amperage draw for each component.
5. Quantities of each component.
6. Total current draw for all components type/model.
7. Total current draw of each subtotal.
8. Calculate required battery Amp Hours (Standby + Alarm Operation requirements).
9. Provide Amp Hours of Batteries you intent to provided – less the required capacity and list the spare Amp Hours available.
10. Indicate the installation date (if applicable) for standby lead acid batteries per NFPA 72.

2.11 **Voltage Drop Calculations** for all notifications circuits in the FACP and for each sub-panel with a battery back up. Account for each notification appliance's voltage draw, and provide total draw and drop for each circuit. Indicate notification appliance model and voltage drop corresponding with those listed in the applicable manufacturer's product data sheet (Cut Sheets).

2.12 **Point-to-Point or Ohms Law calculations.**

2.13 **Zone or Circuit used in calculations.**

2.14 **Voltage Drop,** percent not to exceed listed manufacturer's operating range.

NOTE: Voltage Drop listed manufacturer's operating range: Providing a 10% safety factor will allow the expansion of the circuit/addition of appliances in the future.

1. **"Visible" Appliances" (Strobes),** calculate the voltage crop using the candela draw for each device shown on the floor plans. Use the listed drop shown in the manufacturer's data specifications (Cut Sheets).
2. **"Audible Appliances" (Horns or Bells),** calculate the voltage drop using the listed drop shown in the manufacturer's data specifications (cut sheets).

2.15 Provide formula used for calculations.

NOTE: Actual voltage drops shall be witnessed and recorded by the Project Inspector during the testing of the circuit under full load.

2.16 Applicable codes: Ensure the current codes are listed on the plans.

3. PRODUCT DATA (CUT) SHEET SUBMITTAL: Product Data Sheet Submittal shall include the following information and details as applicable to the project:

3.1 Current and legible copies of manufacturer's product data specification sheets (Cut Sheets) for all equipment used.

1. Include **all pages** of the product data sheets.
2. Product data sheets must include the current draw of the components.
3. Include cut sheets and CSFM Listing for existing Fire Alarm Control Panels and Extender Panels for compatibility confirmation.

3.2 CSFM Listings: Legible copies of current applicable California State Fire Marshal (CSFM) Listings for each component and control unit used. New panels must be listed, and have a copy of the current CSFM Listings. Listings must match those on the plans.

3.3 Audible Devices are listed to produce the California Temporal Pattern either via the Main Fire Alarm Control Panel, or by self-generation.

1. **Additions or Modifications** to existing systems, provide CSFM Listing for any new FACP's.
2. If the existing campus system does not currently provide the California Temporal Pattern, additions/modifications to the system do not have to meet that requirement. The pattern used on any particular campus must be uniform throughout the campus. Synchronization of the patterns is highly recommended to eliminate "overlapping" of tones or patterns.
3. Provide a letter from the District Office certifying that the existing system does not generate the California Temporal Pattern.

3.4 ORDER OF SUBMISSION:

3.4.1 Submit Manufacturer's Product Data Sheets (Cut Sheets) followed immediately by

3.4.2 A complete (all pages) copy of the applicable CSFM Listing, then

3.4.3 The next Cut Sheet(s) with applicable CSFM Listing, and so on until all components of the system are accounted for.

NOTE

THE ABOVE ITEMS CONSTITUTE A CHECK LIST FOR MINIMUM SUBMITTAL REQUIREMENTS. ADDITIONAL INFORMATION MAY BE PROVIDED OR REQUIRED DEPENDING UPON THE PROJECT'S COMPLEXITY AND SITE CONDITIONS.

UPON COMPLETION AND ACCEPTANCE OF THE PROJECT, A REPRODUCIBLE "AS BUILT" SET OF DRAWINGS OF THE ENTIRE FIRE ALARM SYSTEM OR THE AREAS WORKED UPON, SHALL BE PROVIDED TO THE OWNER OR THE OWNER'S RESPRESENTATIVE.